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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,880	12/17/2004	Dietmar Temmler	543822008000	6590

25227 7590 08/04/2006
MORRISON & FOERSTER LLP
1650 TYSONS BOULEVARD
SUITE 300
MCLEAN, VA 22102

EXAMINER

LE, THAO P

ART UNIT PAPER NUMBER

2818

DATE MAILED: 08/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/501,880	Applicant(s) TEMLER ET AL.	
	Examiner Thao P. Le	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-10 is/are pending in the application.
- 4a) Of the above claim(s) 9 and 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7/20/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the amendment and remark made on 06/09/2006.

Claims 1, 3, 5, 7, 8 have been amended.

Claim 2 has been cancelled.

Claims 1, 3-8 are pending.

Applicant's remark is fully considered. However, claims 1, 3-8 still stand rejected based on new ground of rejection below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jammy et al., U.S. Patent No. 6,222,218, hereinafter Jammy, in view of Chooi et al., U.S. Patent No. 6,486,080, hereinafter Chooi.

Regarding claims 1, 8 Jammy discloses a memory chip comprising a substrate 10, a memory cells having a trench capacitor 36 and a transistor 40a (See Figs. 3a-3l), the trench capacitor at least partially having a filling (Figs. 3f-3j), the transistor having source/drain terminals 50, and a gate terminal 16b/16d/16e, the drain terminal being electrically conductively connected to the trench capacitor (Fig. 3l), wherein the filling at least partially has a material which is unstable at high temperatures (high dielectric constant material 24, sensitive to high temperature, lines 7-29, Col. 8) and the filling is not exposed to a high-temperature process. It is inherent that the filling is formed after high temperature process during fabrication because the filling 24 in Jammy is described as temperature sensitive and is unstable at the temperature of about 550 oC and above.

Still regarding claim 1, Jammy discloses the high temperature unstable materials selected from the following group: zirconium oxide, strontium titanium oxide (lines 24-28, Col. 8) but fails to disclose the high temperature unstable material is selected from at least one of the following materials: hafnium oxide, lanthanum oxide, and yttrium oxide.

Chooi discloses the material is either hafnium oxide or zirconium oxide used as high dielectric constant material in memories or capacitors. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use either zirconium oxide or hafnium oxide because both materials are equivalent in

characteristics such as physical and chemical properties, both materials have high dielectric constant, high permittivity, low leakage and excellent reliability for alternative gate dielectric applications.

Regarding claim 4, Jammy discloses the filling at least partially has a metallic material 26 (lines 24-39, Col. 8).

Regarding claim 5, Jammy discloses the wall of the trench is at least partially covered with a dielectric material 20 (or 24), a metallic layer is at least partially applied on the dielectric layer (bottom/top electrode, 22/24) and the metallic is connected to drain terminal of the transistor (Fig. 2i).

Regarding claim 6, Jammy discloses wherein an electrically conductive layer formed in a manner adjoining the trench in the substrate (50, Fig. 3l)

Regarding claim 7, Jammy discloses the opening is formed in the substrate and a conductive connection between the filling and the drain terminal (30, Fig. 3l) is formed through the opening and a dielectric layer is at least partially applied on a side of the trench. It is conventional in the art that the epitaxial layer would have been formed on the substrate and the opening is formed within the epitaxial layer.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jammy et al., U.S. Patent No. 6,222,218, hereinafter Jammy, in view of Chooi et al., U.S. Patent No. 6,486,080, hereinafter Chooi, and further in view of Laibowitz et al., U.S. Patent No. 6,211,543, hereinafter Laibowitz.

Regarding claim 3, Jammy discloses the filling is a high dielectric constant material (lines 24-28, Col. 8) but fails to disclose the filling is silicate compound.

Laibowitz discloses the filling of the trench in trench capacitors is silicate compound. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use either the dielectric materials disclosed in Jammy or silicate of Laibowitz because these materials have similar chemical properties such as high dielectric constant and unstable at high temperature.

Conclusion

For the above reasons, it is believed that the rejections should be sustained. Feature of an invention not found in the claims can be given no patentable weight in distinguishing the claimed invention over the prior art.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP ' 706.07(a). Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for response to this final action is set to expire **THREE MONTHS** from the date of this action. In the event a first response is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and

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any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for response expire later than SIX MONTHS from the date of this final action.

When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to whose telephone number is (571) 272-1785. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on 571-272-1787. Other inquiries of this application should be called to (571) 272-1562 or the fax number (571)-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thao P. Le
Examiner
AU 2818
July 26, 2006.